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EXAMINER
MCCRACKEN, DANIEL

ART UNIT	PAPER NUMBER
1754	

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DATE MAILED: 11/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/690,838	DAY ET AL.	
	Examiner	Art Unit	
	Daniel C. McCracken	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10,12,14,17 and 18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,12,14,17 and 18* is/are rejected.

7)☒ Claim(s) *10, 12, 17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: [illegible]

DETAILED ACTION

Applicants' remarks/arguments have been considered but are moot in light of the objections/rejections and comments that appear forthwith.

Specification

A substitute specification excluding the claims is required pursuant to 37 CFR 1.125(a) because of numerous deficiencies throughout the specification.

Several claims have been amended, including Claim 1, which was substantially amended to incorporate limitations of other claims. The claims as currently presented have support in the original claims filed October 22, 2003. The following is a quotation of MPEP 608.01(l):

> In establishing a disclosure, applicant may rely not only on the description and drawing as filed but also on the original claims if their content justifies it.
> Where subject matter not shown in the drawing or described in the description is claimed in the application as filed, and such original claim itself constitutes a clear disclosure of this subject matter, then the claim should be treated on its merits, and requirement made to amend the drawing and description to show this subject matter. The claim should not be attacked either by objection or rejection because this subject matter is lacking in the drawing and description. It is the drawing and description that are defective, not the claim.
> It is, of course, to be understood that this disclosure in the claim must be sufficiently specific and detailed to support the necessary amendment of the drawing and description.

Thus, while Applicants' may rely upon the original claims as part of their disclosure, the disclosure is still deficient. Appropriate correction (i.e. incorporation of the claimed subject matter into the description) is required.

Further, the specification would appear to contain "incorporations" (i.e. copying and pasting) of documents prepared for other purposes (provisional applications, academic publications and the like) in a piecemeal fashion. **This practice makes the specification difficult to read, understand, and has led to numerous inconsistencies and errata.** *See e.g.*:

(1) The table on page 5 contains a title that is insufficient. First, the table is not labeled as such. Second, Applicants cite no fewer than 5 authors works on page 5 (Glaser, Mann, Steiner, Hoshi

and Nishio). It is unclear whether the results reported in the table belong to any of the 5 authors cited, or Applicants themselves. **(2)** On page 7, lines 28-30, there is a discussion of "the size microbial biomass in the adsorbents" in a particular order. The discussion is followed by a short cite to Fig 1. Figure 1, as set forth later in the Applicants' application shows a method for production of renewable hydrogen. *See* BRIEF DESCRIPTION OF THE DRAWINGS, p. 15; Discussion Fig. 1, p. 29; Figure 1 (page not numbered). The two cannot be reconciled. **(3)** Page 14 contains an unlabeled figure that is not referred to in the description. This illustration should be converted to a figure for printing purposes in the event a patent should issue. **(4)** Page 17 makes reference to Table 1 (*see* Line 13), but the description does not match the table as described in # (1), *supra*. (Was "Table 1" not copied and pasted in?) **(5)** Similarly, "Figure 1" makes another appearance on Page 17. *See* Line 20. This time, Figure 1 "presents photograph of the NH_4HCO_3-char fertilizer samples." Figure 1, as discussed in # (2), *supra*, shows a method for production of renewable hydrogen, not photographs. **(6)** While apparently an illustration of the results of Example 2, the figure on page 20 does not contain a title. This figure must be converted to a figure for printing purposes, in the event a patent should issue. **(7)** The figure on page 21 does not contain a title, and should also be converted to a figure. **(8)** Page 22 contains references to Figures 16 and 17. *See* Lines 26-28. There are no such figures in the application. If the figures on page 21 and 23 were intended to be Figures 16 and 17, they should be renumbered and labeled as such. **(9)** More discrepancies between figures/tables cited and figures/tables presented appear on Page 35. *See* Line 10 (reference to Figs 1 and 2), Line 23 (reference to Table 1), Line 29 (reference to Fig. 3) and Line 30 (reference to Fig. 4).

While every effort has been made to identify inconsistencies, this list is by no means complete. Applicants must make a *careful* and *thorough* review of the specification and correct any errors and inconsistencies in such a manner that it does not insert any new matter into the specification.

Applicants' are also directed to 37 C.F.R. §§1.71-1.77 and MPEP 608 related to the form and content of the specification and disclosure. Applicants have inserted what would appear to be their invention into a section entitled "Global Potential." *See* p. 21 (start of "Global Potential" section), p. 29, Line 30 *et seq*. (Discussion of the Fig. 1 that appears as its own separate page). Such a discussion would be better placed in the "Detailed Description of the Invention." In general, the format provided in MPEP 608.01(a) is preferred.

A substitute specification must not contain new matter. The substitute specification must be submitted with markings showing all the changes relative to the immediate prior version of the specification of record. The text of any added subject matter must be shown by underlining the added text. The text of any deleted matter must be shown by strike-through except that double brackets placed before and after the deleted characters may be used to show deletion of five or fewer consecutive characters. The text of any deleted subject matter must be shown by being placed within double brackets if strike-through cannot be easily perceived. An accompanying clean version (without markings) and a statement that the substitute specification contains no new matter must also be supplied. Numbering the paragraphs of the specification of record is not considered a change that must be shown.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 104, 107, 112, 113, 120, 160, 130, 144. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin

as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "123" has been used to designate both fossil fuel based carbon dioxide and flue gasses. *See* pp. 31-32. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the heat, steam, oxygen, and carbon dioxide as claimed in currently amended Claim 4 must be shown or the feature(s) canceled from the claim(s). Further, the addition of a process stream that contains nitrogen, as claimed in currently amended Claim 7 is not shown.

Figures 2-4 in general do not show any claimed subject matter. While Figure 2 does show a mixing apparatus, none of the mechanical features are actually claimed. (Claim 8 only claims brining the solid carbon charcoal residue, ammonia, etc into contact – it does not specify the mechanical means with which to do so.) Figure 2 should be labeled prior art.

Applicants are directed towards the standards for drawings. *See* 37 C.F.R. §1.81, *et seq.* Appropriate correction or cancellation of the drawings is required. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 10, 12, and 17 objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim shall not serve as the basis for another multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits.[1]

[1] Claims 10, 12 and 17 were in fact objected to in the first office action. Applicants are directed, *again*, to MPEP 608.01(n)(1)(B)(4). The example given is particularly educational: *"Claim 8. A gadget as in claim 5 (claim 5 is a multiple dependent claim) or claim 7, in which –"* Compare this language to Claim 10 of Applicants' application, which states "The process in accordance with Claim 1 or 8 (Claim 8 is a multiple dependent claim).

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-10, 12, 14, 17 and 18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

At the outset, it is noted that while *original* claims *can* constitute their own description, *see In re Koller*, 204 USPQ 702, 706 (CCPA 1980) (citations omitted), the claims alone do not address the adequacy of the written description in describing the claimed invention in sufficient detail such that one skilled in the art can conclude that the inventor had possession of the claimed invention. Thus, the analysis begins with comparison of the pending amended claims to the original claims and specification as filed on October 22, 2003.

Hydrogen Separation and Ammonia Production

Currently amended Claim 1 is drawn towards a process for the preparation of a solid carbon charcoal residue wherein the steps comprise: d) processing the gas stream to separate a hydrogen stream; e) optionally combining the hydrogen stream with nitrogen to produce ammonia or ammonium nitrate or other nitrogen compounds. Claims 2-10, 12, 14, 17 and 18 which depend either directly or indirectly upon Claim 1, import its limitations. Claims 5-6 further limit the hydrogen stream step. Claim 7 further limits the ammonia production step.

As to the process for producing hydrogen and in turn ammonia, the Examples provided by Applicants make no mention of separating hydrogen to make ammonia that is used in the

process. Applicants do discuss the introduction of an aqueous solution of ammonium nitrate as well as hydrated ammonia, but there is no disclosure that either of these substances were made by the process as claimed. *See* p. 19-20. Support in the Applicants initial disclosure is limited to original claim 7 (stating that "hydrogen and air are used in standard industrially acceptable techniques to produce ammonia or ammonium nitrate") as well as a brief discussions of ammonia production on p. 15 and 28.

Applicants' do suggest that "[h]ydrogen, after separation, can be converted into ammonia using the industry standard Haber-Bosch process." Specification, p. 15. The Haber-Bosch process, however, operates at high pressures. *See* US 1,386,760 to Bosch, Col 4, Lines 128-130 (noting compressions in the range of 150 to 200 atmospheres). *See also* Brown, LeMay, and Bursten Chemistry, The Central Science, 7th Ed., Prentice-Hall, Inc. 1997., p. 542 ("The engineering needed to implement the Haber process requires the use of temperatures and pressures [] to approximately 500°C and 200 atm[]."") The Applicants process makes no mention of how to deal with ammonia at such high pressures, whether or not they are favorable to the reactions that produce "ammonium nitrate or other nitrogen compounds" as claimed.

Applicants discuss producing ammonia from an ECOSS^2 process. *See* p. 28, Line 27, *et seq*. Applicants state "[f]rom the section in *this* paper on Production Chemistry Calculations, we determined that the ECOSS process *could* only utilize 31.6% of the hydrogen as we were limited by the total amount of char produces and the target 10% nitrogen loading." An exhaustive search of *this* application was conducted for any such calculations that would indicate Applicants were making ammonia by this ECOSS process. None were found. Further, Applicants note that "it *possible* that a single pass NH_3 converter could be used." Applicants' later discussion of the ammonia production process repeats some of the assertions made in the discussion on page 28. *See* p. 31. Applicants use such language as "[a]t conditions needed to sequester .75 to 1.5 tons

per hectare," (hypothetical) and "[t]he resulting balance *then points to* 60-67% of the hydrogen produced. (emphasis added).

Applicants discussion of the ammonia process *in toto* points to applicants recognizing that their process produces a off-gas stream that *could* be processed to hydrogen which in turn was sufficient for processing into ammonia. Recognizing the possibility is not enough to demonstrate that Applicants had possession of the invention at the time of filing.

Coating

Limitation h) of Claim 1 recites a coating for the charcoal residue that is optionally selected from the group consisting of gypsum, plaster, sulfur, or polymers which can dissolve. Support for coating the charcoal residue is found on Page 32, Lines 24-27. Applicants have not described how a coating is applied to charcoal residue particles on the order of 1.0-6.0 mm. *See* Example 2. The Examples provided by Applicants do not provide any illustration of a coating being applied to the charcoal residue particles, leading the Examiner to conclude that this part of the invention was not in the possession of Applicants at the time of filing.

"Further Processed"

Claim 4 is drawn to further processing the charcoal residue through a variety of methods. Claim 4 is supported by originally filed Claim 4. The specification adds little information of consequence. *See* p. 36, Lines 29, *et seq*. (Discussion of addition of other nutrients.) *and* p. 32, Lines 22-26 (recognizing that other materials can be mixed with the charcoal residue or coated on the charcoal residue). Applicants' Examples provide only enough support to indicate that a "char" had been produced and particle size and pore structure can be varied. *See* p. 19-20. There is no indication that Applicants possessed an invention that included further processing or addition of other materials to the charcoal residue. Further, Applicants do not address how each listed treatment (mechanical, heat, steam, oxygen, acid, etc) affects the process and the resulting

[2] It is unknown what this acronym stands for. A search of the specification to find its meaning was unsuccessful.

"charcoal-fertilizer product." (*i.e.* Is Examiner to assume a mechanical agitator performs the same as HF acid? The disclosure is sufficiently lacking to indicate that Applicants don't know if they would, supporting Examiner's conclusion that Applicants lacked possession of the invention at the time of filing.)

Adsorption

Claims 14 is drawn to processes in accordance with Claim 1 wherein compounds are adsorbed into the internal pore structure of the charcoal. Support for Claim 14 is found in Claim 14 as originally filed and Page 32, Line 22. Applicants fail to describe with any detail how "compounds beneficial for plant growth are adsorbed into the internal pore structure of the carbon charcoal residue." Claim 14. "Adsorption" has a specific meaning in the art related to mass transfer phenomena. *See generally* Don W. Green, Ed., Perry's Chemical Engineer's Handbook, §16 "Design Concepts – Introduction" (7th Ed. 1997) ("Adsorption involves, in general, the accumulation (or depletion) of solute molecules at an interface (including gas-liquid interfaces, as in foam fractionation, and liquid-liquid interfaces, as in detergency). There is nothing in the specification to indicate possession of an adsorption process at the time of invention.

Conversion of SO_2 and NO_x

Claim 18 is drawn to the conversion of carbon dioxide to ammonium bicarbonate, the conversion of sulfur dioxide to ammonium sulfate, and the conversion of nitrous oxide to ammonium nitrate. Example 2 does disclose the conversion of CO_2 to ammonium bicarbonate, but does not disclose the conversion of sulfur dioxide to ammonium sulfate or the conversion of nitrous oxide to ammonium nitrate. There is nothing in the specification to indicate possession of a process that could make such conversions.

Written Description Conclusion

The mere citation of a plurality of prior art processes does not constitute the disclosure of a patentable invention. The fact that others, like Carl Bosch, accomplished this feat is irrelevant in showing the Applicants had possession of what was claimed at the time of invention. Applicants claimed treatment of the charcoal residue, the coating process, the adsorption process, the conversion of sulfur dioxide to ammonium sulfate, and the conversion of nitrous oxide to ammonium nitrate are also all without sufficient disclosure to indicate that Applicants possessed the invention at the time of filing.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 4, 5, 8, 10, 14, and 18, are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to Claim1: Limitation b) lacks proper antecedent basis. Applicants refer to an "off-gas stream" and "the gas stream." It is not clear, in light of the rest of Claim 1, which gas stream is being referred to. Limitation d) lacks proper antecedent basis. It is not clear whether this is a separate gas stream, the off gas stream (or which off-gas stream for that matter). In general, Claim 1 is drafted in a manner that does not indicate the sequential steps needed to accomplish the claimed process.

As to Claim 4, "processed under various conditions including but not limited to" and "to optimize the residue" is indefinite.

As to Claim 5, Applicants use the term "extract" which has a particular meaning in the art that does not include the use of ceramic membranes, steam reforming or catalytic reforming.

As to Claim 8, "gas stream" lacks proper antecedent basis. It is unclear whether it refers to the "off-gas stream" of Claim 8, or any of the gas streams of Claim 1 upon which it depends.

As to Claim 10, "off gases" is indefinite. It is unclear as to which off gases this refers to. Is the same off gas stream in Claim 1, or a different one as Fig. 1 would imply.

As to Claim 14, "compounds beneficial for plant growth" is indefinite. This would seem to include anything ranging from anhydrous ammonia to horse manure.

As to Claim 18, "the gas stream" is indefinite. Is it the "off-gas stream" or the "gas stream" separated to make hydrogen.

Claims 2, 3, 6, 7, 9, 12, and 17, for purposes of the 35 U.S.C. §112 second paragraph rejections made above, are objected to as being incomplete for depending upon a claim which has been rejected.

Art Rejections and Priority

Applicants have claimed benefit under 35 U.S.C. §119(e) of U.S. Provisional Patent Application No. 60/420,766, filed October 22, 2002, entitled "The Production and Use of a Soil Amendment made by the Combined Production of Hydrogen, Sequestered Carbon and utilizing Off Gasses Containing Carbon Dioxide." This currently pending non-provisional application was filed on October 22, 2003. The issue then becomes what claims in the pending application can find their support in the provisional application as to be entitled to the earlier filing date. *See* MPEP 706.02 V. (D) ("If the application properly claims benefit under 35 U.S.C. 119(e) to a provisional application, the effective filing date is the filing date of the provisional application for any claims which are fully supported under the first paragraph of 35 U.S.C. 112 by the provisional application.")

Close examination of the provisional application reveals many of the same fatal defects that the non-provisional application exhibits – namely lack of an adequate written description. Examiner considers the first paragraph on Page 2 of the provisional application as well as the

claims as the only relevant material. The Examiner, owing to the substantial similarity between the provisional and non-provisional application, finds the provisional application equally lacking for the reasons set forth in the rejections made under 35 U.S.C. §112, first paragraph, *supra.*

As none of the currently pending claims are support by the provisional application, they are treated with the priority date of the non-provisional application, October 22, 2003.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Due to the lack of clarity in the claims and specification, it is difficult to ascertain what the claims encompass. The following is offered for the sake of completeness:

1) the pyrolyzing of a biomass to generate an off gas and a charcoal residue
2) separating the off-gas of step (1) to obtain a stream of hydrogen,
3) combining the hydrogen of step (2) with nitrogen to produce ammonia or nitrogen containing compounds,
4) combining the ammonia or nitrogen compound of step (2), charcoal residue of step (1), and an off-gas stream from a combustion or other process containing CO_2, SO_2, or NO_x
5) Forming ammonium bicarbonate in or on the charcoal residue and forming ammonium salts of NO_x, SO_2 in contact with the ammonium bicarbonate/charcoal residue.

6) "treating" the product of step (5)

Claims 1-10, 12, 14, 17-18 rejected under 35 U.S.C. 103(a) as being unpatentable over Lee, J.W. and R. Li, *Integration of Coal-Fired Energy Systems with CO_2 Sequestration through NH_4HCO_3 Production*, Energy Conversion Management 2003; 44: 1535-1546 ("the ECM Paper")[3] in view of Asada, et al. *Science of Bamboo Charcoal: Study on Carbonizing Temperature of Bamboo Charcoal and Removal Capability of Harmful Gases*, Journal of Health Science, 48(6) 473-479 (2002) ("Asada") and in further view of Glaser et al, *Ameliorating physical and chemical properties of highly weathered soils in the tropics with charcoal – a review*, Biology and Fertility of Soils; 35; 219-230 (2002).

All of the components of Applicants claimed invention are admittedly old, pieced together to yield a process lacking unexpected results.

The ECM Paper teaches the generation of ammonia from the addition of hydrogen to nitrogen. CO_2 is then added to the ammonia to produce ammonium bicarbonate (a fertilizer). *See* p. 1539. The ECM Paper also teaches the conversion of NO_x and SO_x to fertilizers. *Id.* at 1540. The ECM Paper further teaches that CO_x, NO_x, and SO_x can be obtained from the off-gas streams of industrial processes, like power plants that burn coal (a carbonaceous compound). *Id.* Further, the ECM paper explicitly contemplates application to biomass-fired industrial processes. *Id.* at 1541. The ECM Paper does not teach adsorbing the fertilizer onto a charcoal residue.

Asada teaches a process for the optimizing a carbon char product of pyrolyzation for the adsorption of ammonia. *See* p. 474.

Glaser provides the motivation to use charcoal as a soil fertilizer. *See generally* p. 227 *et seq.* (noting the benefits of trapping nutrients in the pores of amorphous carbonized material, benefits of carbon sequestration and greenhouse gas reduction). Glaser further identifies factors

influencing the properties of the charcoal as a fertilizer, not the least of which was the addition of nitrogen. (i.e. additional "motivation") *See* p. 224.

None of the references squarely addresses the hydrogen separation and ammonia production steps (although the ECM Paper comes close, *see* p.1538). What applicants have claimed to have done is reclaimed a material from their process (hydrogen) to use in the production of ammonia which is later introduced back into their process. Both processes are admittedly well known. The act of reclaiming a potential waste (here, the pyrolic gas) is hardly new in the various process industries. It would have been obvious to a person of skill in the art to combine the processes to enhance the commercial opportunities of their process, and obvious to optimize such a process. *See In re Kamlet*, 185 F.2d 709, 88 USPQ 106 (CCPA 1950).

Conclusion

The Specification is poorly drafted, difficult to read, and replete with errors. It is an obvious compilation of other documents, copied and pasted together with little thought given towards the requirements for patentability. The Specification does not provide sufficient description to convey to a person of skill in the art that Applicants had the claimed invention in their possession at the time of filing. The claims as drafted have numerous deficiencies.

The process is a combination of known processes or technologies, and is accordingly obvious over the prior art. All art cited by the Examiner in the original office action is relied upon as indicative of the ordinary skill in the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel C. McCracken whose telephone number is (571) 272-6537. The examiner can normally be reached on Monday through Friday, 9 AM - 5 PM EST.

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[3] The ECM Paper was available online 18 October 2002. As such, the ECM Paper qualifies as 35 U.S.C. §102(b) art over the non-provisional application, making it eligible for a rejection under 35 U.S.C. §103.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Daniel C. McCracken

DCM

STUART L. HENDRICKSON
PRIMARY EXAMINER